



NOTES

MINERAL DEFICIENCIES

GENERALLY, WHAT ARE THEY?

PATHOLOGY & CAUSES

- Inadequate dietary minerals (vital for normal health/function)
- Minerals
 - 5% of average diet

CAUSES

- Poor diet/required mineral absorption
- Macrominerals
 - Calcium, phosphorus, potassium, sulfur, sodium, chloride, magnesium
 - Adults > 100mg/day/< 1% of total body weight required
- Trace minerals/elements
 - Iron, zinc, copper, manganese, iodine, fluoride, cobalt, selenium
 - Adults 1–100mg/day/<0.01% total body weight required

SIGNS & SYMPTOMS

- See individual disorders

TREATMENT

- See individual disorders

DIAGNOSIS

- See individual disorders

VISIT...

LANZAROTE
Caliente.COM

IODINE DEFICIENCY

osms.it/iodine-deficiency

PATHOLOGY & CAUSES

- Insufficient iodine intake → **thyroid enlarges** to compensate thyroid hormone production demands
 - Low iodine levels → ↓ T4, T3 production → ↑ thyroid stimulating hormone (TSH) for restoration T4, T3 production → TSH stimulates thyroid growth
- World Health Organization (WHO) recommends
 - < five years old: 90µg/day
 - 6–12 years old: 120µg/day
 - > 12 years old: 150µg/day
 - Pregnant, lactating: 250µg/day

CAUSES

Malnutrition

- Body does not create iodine; diet only source
- High deficiency rates
 - Europe, Africa, Asia
- Low deficiency rates
 - Industrialized countries (most water, salt, bread iodized)

RISK FACTORS

- Pregnant/nursing, children, vegan/gluten-free individuals

SIGNS & SYMPTOMS

Goiter

- Thyroid enlarges because ↑ TSH
 - **Compensation strategy:** decreased thyroid hormone production → goiter formation
- Low iodine levels → ↓ T4, T3 production → ↑ thyroid stimulating hormone (TSH) attempts restoration of T4, T3 production → TSH stimulates thyroid growth

- Often, goiter diffuse initially; eventually may develop nodules (can enlarge, calcify over time)
- If large → choking, difficulty swallowing/breathing

Hypothyroidism

- ↓ **thyroid hormone levels** (iodine necessary for production)
- Fatigue, constipation, weight gain, muscle weakness

Pregnancy

- Miscarriages, premature delivery, fetal congenital abnormalities
- Child's physical growth, mental development decrease

Cretinism

- **Infants, children:** untreated iodine deficiency → **cretinism** (permanent intellectual disability, developmental deficiency)

DIAGNOSIS

LAB RESULTS

- Iodine concentration in urine; site of ~90% ingested iodine, good site for current iodine nutrition measurement
 - **Mild iodine deficiency:** 50–99µg/day
 - **Moderate deficiency:** 20–49µg/day
 - **Severe deficiency:** < 20µg/day

OTHER DIAGNOSTICS

- Thyroid size measurements (reflect iodine nutrition over extended periods)

TREATMENT

OTHER INTERVENTIONS

- Iodine supplementation, iodine enriched foods
 - Dairy: cheese, milk, yogurt
 - Meat/alternatives: shellfish, saltwater fish, eggs

ZINC DEFICIENCY

osms.it/zinc-deficiency

PATHOLOGY & CAUSES

- Insufficient zinc intake
- Recommended doses
 - Oral intake: 4–15mg/day
 - Dietary intake: 8mg/day (children), 11mg/day (biologically male), 9mg/day (biologically female)

CAUSES

- Malnutrition
- Malabsorption diseases (chronic inflammatory bowel disease)
 - Poor zinc absorption; absorbed in small intestine
- Prolonged breastfeeding
 - Individual's breast milk contains low zinc levels, infant exclusively breastfed
- Acrodermatitis enteropathica
 - Autosomal, recessive, inherited intestinal zinc absorption (partial) defect

SIGNS & SYMPTOMS

- Skin, nails, hair
 - Skin lesions, acne, eczema, alopecia, compromised wound healing
- Immune dysfunction → respiratory, gastrointestinal infections
- Delayed growth/development
- Impaired vision, smell, taste
- Delayed sexual maturation
- Appetite loss

DIAGNOSIS

LAB RESULTS

- Measure zinc biomarkers
 - Red blood cell linoleic acid to dihomo-γ-linolenic acid (LA:DLGA) ratios

TREATMENT

OTHER INTERVENTIONS

- Zinc supplementation, zinc enriched foods
 - Fortified cereals, whole grains, nuts, meats (oysters, beef, lamb)